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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GARCIA, JOANNIE A

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/216,078

Applicant(s)

HSINCHU ET AL

Examiner

Joannie A García

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,4-16 and 20-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,4-8,10-16,20-22,24-26 and 29-34 is/are rejected.
- 7) ☒ Claim(s) 9,23,27 and 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 25.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 5, and 20-23, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially" in claim 5 is a relative term, which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. If applicant intends a particular halogen concentration, it should be clearly recited.

The term "high" in claim 20 is a relative term, which renders the claim indefinite. The term "high" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. If applicant intends a particular voltage device, it should be clearly recited.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2, 4, 5, 8, 20, 22, 24-26, 30, and 32-34, are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu et al (U.S. Patent 5,480,828).

Hsu et al discloses providing a semiconductor substrate 10 having a first region for a MOS where a first oxide layer thickness 26 is desired and a second region where a second oxide layer thickness 28 is desired (Figures 5 and 7), wherein said first oxide layer thickness is greater than said second oxide layer thickness (Figure 5 and 7), forming a gate dielectric layer 12 comprising an oxide layer overlying said semiconductor substrate including said first region and said second region (Figures 4 and 6), masking said dielectric layer to expose said first region (Figure 4 and 6), selectively introducing fluorine impurities by an ion implantation process into an exposed surface of said semiconductor substrate through said gate dielectric layer to form a higher halogen concentration in said first region than in said second region (Figure 4, and Column 3, lines 11-22, and 41-46), performing an oxidizing process on said semiconductor substrate at a temperature of between 900° C to 950° C for a duration of between about 30 to 60 minutes (Column 3, lines 46-48), to simultaneously form said first oxide layer thickness 26 at said first region and said second oxide layer thickness 28 at said second region (Figures 5 and 7, and Column 3, lines 23-27, and 46-55), removing portions of the oxide layer to form (Figure 8), and forming a first memory gate electrode 34 on said second oxide layer, said second oxide layer thickness formed on said semiconductor substrate in a memory region (Figure 8, Column 2, lines 25-27, Column 3, lines 63-67, and Column 4, lines 1-7). Hsu et al discloses as well, that introducing said halogen-containing impurities comprises introducing halogen-containing impurities into said first region and wherein said second region has no halogen concentration therein (Figure 4).

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Claims 6, 7, 21, and 29, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al as applied to claims 2, 4, 5, 8, 20, 22, 24-26, 30, and 32-34 above, and further in view of Wright et al ("The Effect of Fluorine in Silicon Dioxide Gate Dielectrics").

Hsu et al discloses implanting fluorine impurities into semiconductor substrate 10 at a dosage of 7.5×10^{15} to 3×10^{16} atoms/cm² to increase the oxidation rate of the substrate, resulting in a thicker oxide layer (Column 3, lines 11-20). Hsu et al does not disclose implanting said fluorine impurities at a dosage greater than 1×10^{14} atoms/cm² and less than 1×10^{15} atoms/cm².

Wright et al discloses implanting fluorine impurities into a semiconductor substrate at a dosage of 1×10^{12} to 1×10^{16} atoms/cm² to increase oxidation, resulting in a thicker oxide layer (Abstract, Experimental, and Summary). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Hsu et al and Wright et al to enable the step of forming the thicker oxide layer 26 in the first region to be performed.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al as applied to claims 2, 4, 5, 8, 20, 22, 24-26, 30, and 32-34 above, and further in view of the following comment.

Hsu et al does not teach that said semiconductor device comprises a flash EEPROM semiconductor device. However, a substrate produced would be suitable as a substrate for formation of a flash EPROM semiconductor device.

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Claims 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al as applied to claims 2, 4, 5, 8, 20, 22, 24-26, 30, and 32-34 above, and further in view of the following comments.

Hsu et al discloses formation of a memory cell array over one of the gate oxide regions (Column 1, lines 7-22). The examiner takes judicial notice that the particular gate formation steps of claims 11-16 were known to be suitable at the time of applicant's invention in formation of a memory array. It would have been within the scope of one of ordinary skill in the art to employ the prior art process for its disclosed intended purpose to achieve the formation step of a memory cell array of Hsu et al.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al as applied to claims 2, 4, 5, 8, 20, 22, 24-26, 30, and 32-34 above, and further in view of the following comments.

It would have been a matter of routine optimization within the teachings of Hsu et al to determine a suitable pressure to achieve the oxide layers 26/28 formation steps.

Claims 9, 27, and 28, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Claim 23 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956. See **MPEP 203.08**.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner J. Garcia whose telephone number is (703) 306-5733. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax number for this group is (703) 308-7722 (and 7724), and (703) 305-3431 (and 3432). MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.


JAG
12/14/03


George Fourson
Primary Examiner